

What is claimed is:

1. An imaging system comprising:
an array of pixel sensors;
a first bank of sample-and-hold circuits connected to the pixel sensors;
a second bank of sample-and-hold circuits connected to the pixel sensors;
a first analog-to-digital converter;
a second analog-to-digital converter; and
a selection circuit operable to select and connect a sample-and-hold circuit from the first bank to the first analog-to-digital converter and simultaneously select and connect a sample-and-hold circuit from the second bank to the second analog-to-digital converter.
2. The system of claim 1, wherein the array includes a plurality of columns of the pixel sensors, and columns of pixel sensors are connected to respective sample-and-hold circuits in the first bank and to respective sample-and-hold circuits in the second bank.
3. The system of claim 1, further comprising:
a FIFO buffer coupled to receive a digital output signal from the first analog-to-digital converter; and
an adder coupled to determine a difference between a digital output signal from the FIFO buffer and a digital output signal from the second analog-to-digital converter.
4. The system of claim 1, further comprising a control circuit that activates the first bank to sample reset voltages in a first selected set of pixel sensors and activates the second bank to sample integrated voltages in a second selected set of pixel sensors.
5. The system of claim 4, wherein the first selected set of pixel sensors consists of the pixel sensors that are in a row of the array that has just be reset.
6. The system of claim 4, wherein the first selected set of pixel sensors consists of the pixel sensors that are in a row of the array for which an exposure time has lapsed since a last reset of the row.

7. The system of claim 1, wherein:

the selection circuit is operable in a digital correlated double sampling mode, wherein the selection circuit connects a selected sample-and-hold circuit from the first bank to the first analog-to-digital converter and simultaneously connects a selected sample-and-hold circuit from the second bank to the second analog-to-digital converter; and

the selection circuit is operable in an analog correlated double sampling mode, wherein the selection circuit simultaneously connects the selected sample-and-hold circuit from the first bank and the selected sample-and-hold circuit from the second bank to one of the first analog-to-digital converter and the second analog-to-digital converter.

8. An imaging method comprising:

(a) resetting selected pixel sensors in an image sensor;
 (b) sampling reset voltages of the selected pixel sensors;
 (c) converting the reset voltages to digital reset values using a first channel;
 (d) sampling integrated voltage of the selected pixel sensors after lapse of an exposure time;

(e) converting the integrated voltages to digital integrated values using a second channel;

(f) changing which pixel sensors in the image sensor are the selected pixel sensors;
 and

(g) repeating steps (a) to (f) , wherein converting the integrated voltages overlaps with converting the reset voltage.

9. The method of claim 8, wherein converting the integrated voltages for pixel sensors overlaps with converting the reset voltage for other pixel sensors.

10. The method of claim 8, wherein converting the integrated voltages for pixel sensors that are capturing a first frame of a moving image overlaps with converting the reset voltage for other pixel sensors that are capturing a second frame of the moving image.

11. The method of claim 10, wherein repetitions of step (c) provide a continuous stream of the digital reset values including digital reset values for the first frame and the second frame.

12. The method of claim 10, wherein repetitions of step (e) provide a continuous stream of the digital integrated values including digital integrated values for the first frame and the second frame.

13. The method of claim 8, wherein repetitions of step (c) are separated by a time T_{out} , and each repetition of step (e) follows a corresponding repetition of step (c) by a time T_{exp} .

14. The method of claim 13, wherein the time T_{out} is about equal to a required time for output digital values corresponding to a row of the pixel sensors.

15. The method of claim 13, wherein the time T_{exp} is about equal to an exposure time for an image.

16. The method of claim 8, wherein the first channel comprises a first analog-to-digital converter, and the second channel comprises a second analog-to-digital converter.

17. The method of claim 8, wherein repetitions of step (c) provide a continuous stream of the digital reset values.

18. The method of claim 8, wherein repetitions of step (e) provide a continuous stream of the digital integrated values.